



Een WND workshop

Omgaan met misinformatie in wetenschappelijk onderwijs



Tijd: $\pm 1 \frac{1}{4}$ uur



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- Professor of science education, King's College London 2001-2008
- Taught in inner London from 1973-1985

Workshop: Tackling Misinformation in Science Education

ASE 2024 - NORTHAMPTON

Januari 5, 2024

Gebaseerd op het onderzoeksrapport



Science Education in an Age of Misinformation



onderwerpen

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- ▶ Introductie
- ▶ De aard van misinformatie
- ▶ Leerlingfilmpjes
- ▶ Strategieën & suggesties evalueren van informatie
- ▶ afsluiting

On Podcasts and Radio, Misleading Covid-19 Talk Goes Unchecked

False statements about vaccines have spread on the “Wild West” of media, even as some hosts die of virus complications.

November 12, 2021 · By TIFFANY HSU and MARC TRACY



Scientists Fight a New Source of Vaccine Misinformation: Aaron Rodgers

The Green Bay Packers quarterback, one of the most visible athletes in the country, last week used anti-vaccination rhetoric as his reasoning for not getting vaccinated against Covid-19.



Climate Misinformation on Social Media Is Undermining Climate Action

At their worst, social platforms are ideological echo chambers where falsehoods can’t be set straight. To fossil fuel interests, that sounds perfect.

April 19, 2022 | Jeff Turrentine

Research Letter

June 7, 2021

Spread of Misinformation About Face Masks and COVID-19 by Automated Software on Facebook

John W. Ayers, PhD, MA¹; Brian Chu, BS²; Zechariah Zhu³; [et al](#)

» [Author Affiliations](#) | [Article Information](#)

JAMA Intern Med. 2021;181(9):1251-1253. doi:10.1001/jamainternmed.2021.2498



Article | [Open Access](#) | Published: 26 April 2022

Online misinformation is linked to early COVID-19 vaccination hesitancy and refusal

[Francesco Pierri](#) , [Brea L. Perry](#), [Matthew R. DeVerna](#), [Kai-Cheng Yang](#), [Alessandro Flammini](#), [Filippo Menczer](#) & [John Bryden](#)

KFF COVID-19 Vaccine Monitor: Media and Misinformation

[Liz Hamel](#) , [Lunna Lopes](#), [Ashley Kirzinger](#) , [Grace Sparks](#) , [Mellisha Stokes](#), and [Mollyann Brodie](#) 

Published: Nov 08, 2021



AMERICAN
Scientist

Fighting Science Misinformation

BY [KATIE L. BURKE](#)

People are left to fend for themselves in deciding what to believe about media claims. Is there a better way?

Doelen van deze workshop

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- ▶ **Begrip** vergroten van de aard en impact van misinformatie.
- ▶ Wetenschappelijke informatie beter evalueren m.b.v. **Online denkstrategiën** en **kennis van sociale aspecten van wetenschap**
- ▶ **Hoe** integreer je wetenschappelijk redeneren in je lessen?

Bij misinformatie denk ik aan ...

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Menti.com:1175 8369

Deel met je buurmens

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- ▶ Ben jij geïnteresseerd in misinformatie in je lespraktijk?
- ▶ Wat weet je al van misinformatie?

Omgaan met misinformatie

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► Geloofwaardigheid

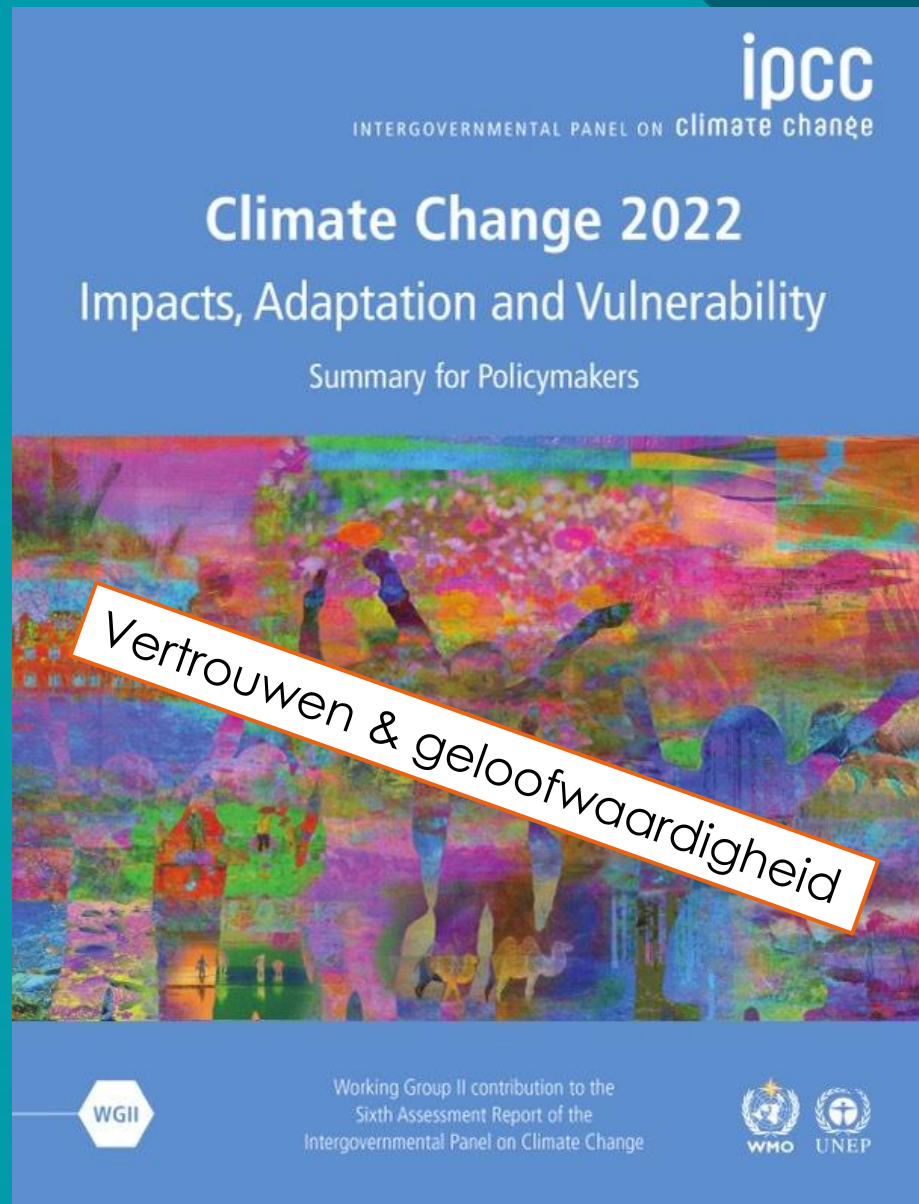




De aard van misinformatie

Klimaatverandering Antropogeen?

10



The auteurs^[5] gebruikten meer dan **14,000 wetenschappelijke studies** om een rapport van **3.949-pagina's** te schrijven, dat door 195 landen werd goedgekeurd.

Relevantie voor wetenschap & wetenschappelijk onderwijs

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- ▶ Wetenschap = systeem om tot kennis te komen
- ▶ Specialisatie = essentieel
- ▶ Meeste mensen zijn geen specialist
- ▶ Wederzijds afhankelijk voor betrouwbare kennis

- ▶ Vertrouwen
 - ▶ Misinformatie is moeilijk te ontkrachten

Wat is misinformatie?

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- ▶ **Misinformatie** - onjuiste informatie die verspreid wordt zonder dat er sprake is van bewuste misleiding.
- ▶ **Desinformatie** - onjuiste informatie waarbij de verspreider weet dat deze onjuist is en de intentie heeft om deze te verspreiden.



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- ▶ 2 minuten: de website bekijken (blijf op de site)
- ▶ 2 minuten: met je buurmens besluiten of de website betrouwbaar is.



KLIMAATFEITEN.NL

Is dit een betrouwbare bron van
wetenschappelijke informatie?

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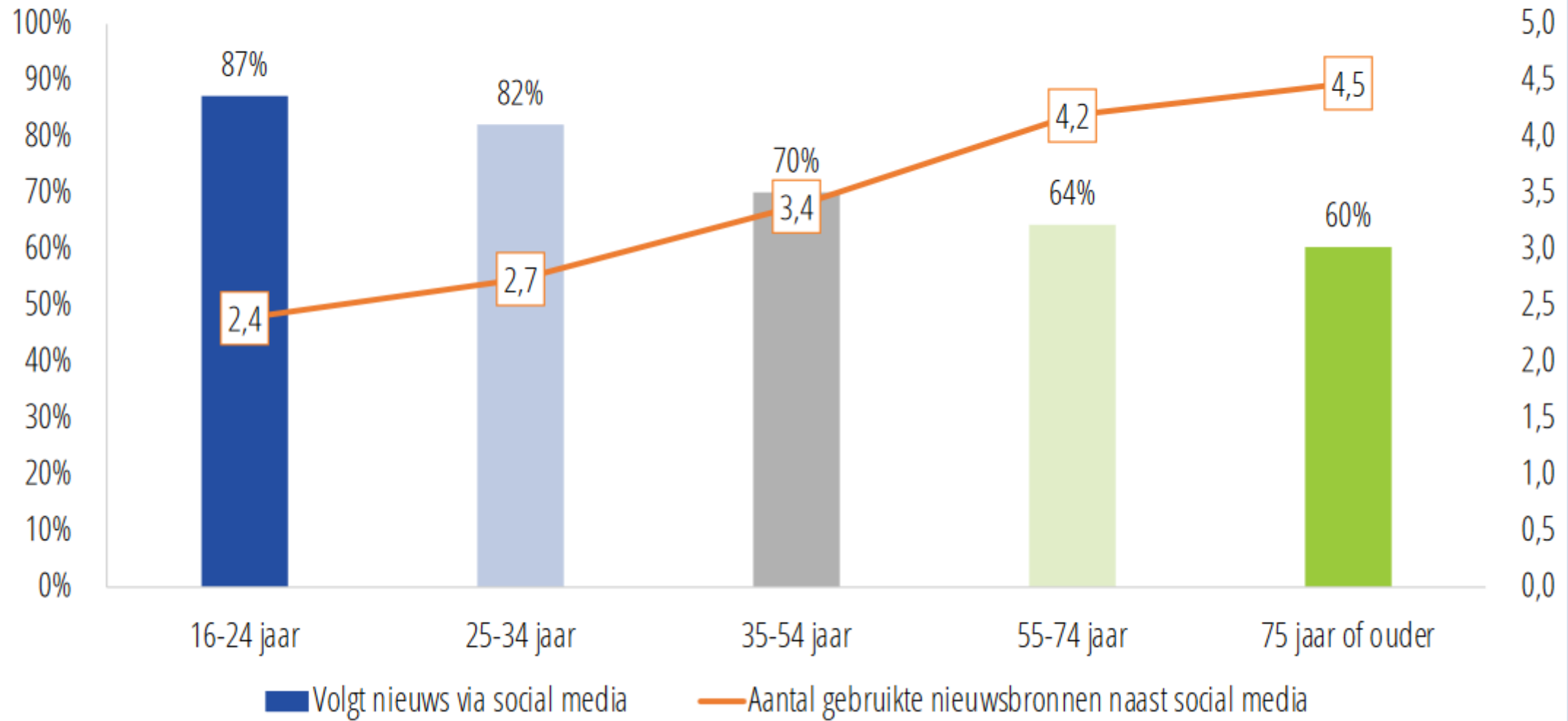
Waarom is beoordelen van informatie belangrijk?

15



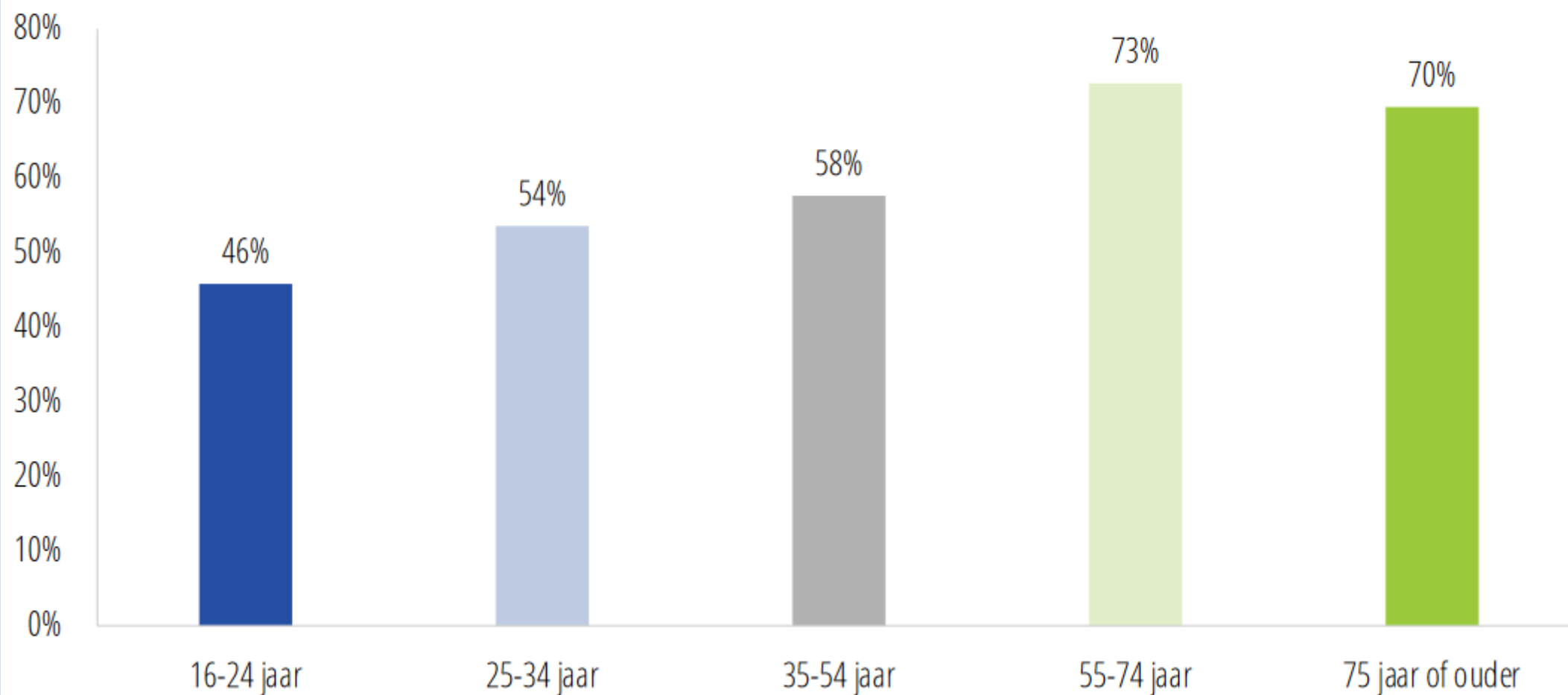
- ▶ 72% van de Nederlanders gebruikt social media als nieuwsbron (Newcom 2022)
- ▶ 90% v.d. tieners maakt bijna continu of meerdere keren per dag gebruik van internet
- ▶ Weinig controle op informatiejuistheid (geen feitenpolitie)
- ▶ Jongeren worstelen met controleren van informatiebronnen (McGrew et al., 2018; Hämäläinen et al., 2021, Hargittai, 2010)

Volgen van nieuws via social media - Naar leeftijd



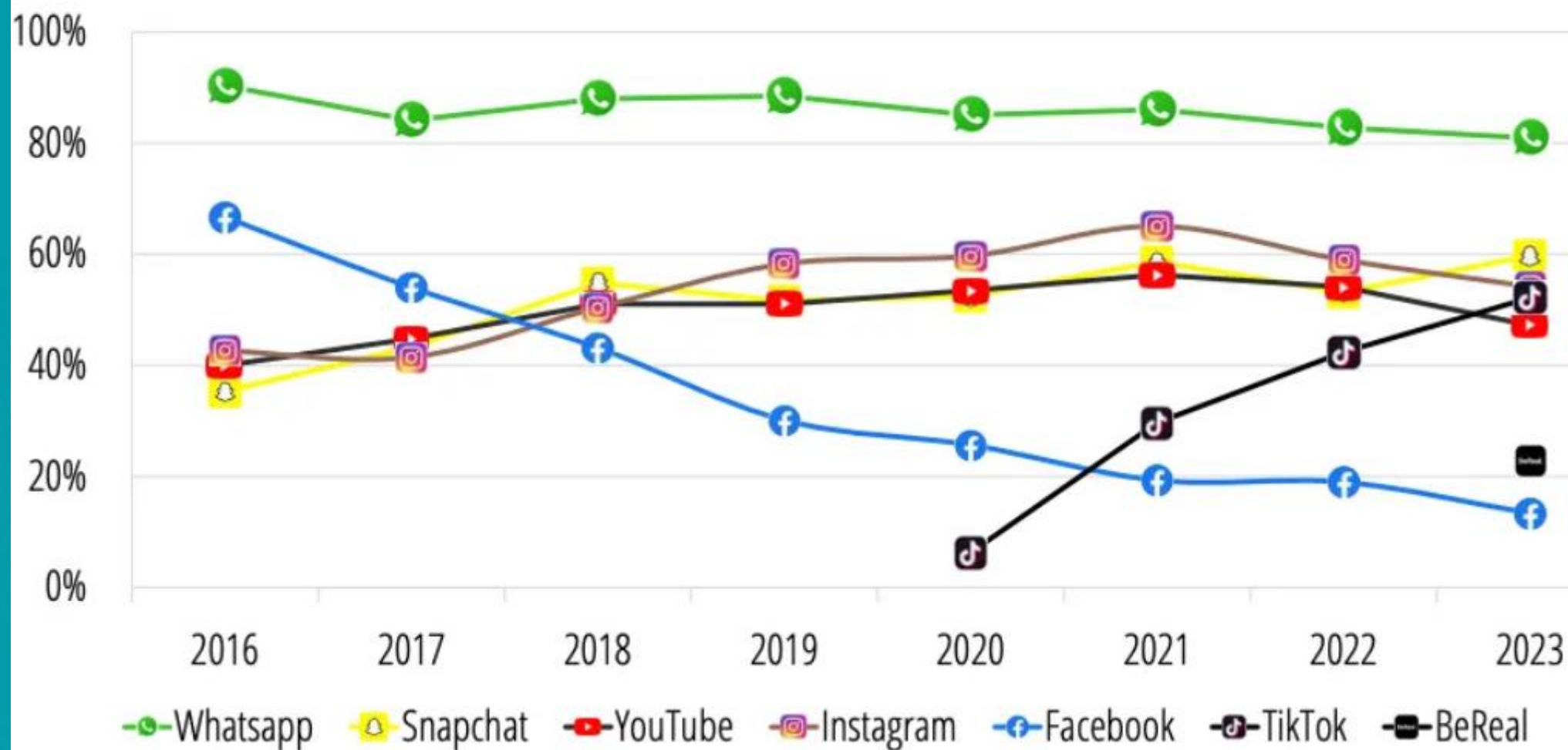
Stelling 'Ik maak mij zorgen over nepnieuws op social media' -

% (Helemaal) mee eens - Naar leeftijd





Dagelijks gebruik social media (%) - Leeftijd 15-19 jaar



Internationaal onderzoek

19



- ▶ A 2019 national survey of 3,446 high school students revealed major deficiencies in evaluating the credibility of online sources (Breakstone et al., 2019; Mathews, 2019).
- ▶ Nine of ten students were unable to come up with a rationale for rejecting a video containing misinformation about voter fraud in the U.S..

Verouderde methodes

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- ▶ We praten vaak over websites i.p.v. Tik-Tok of influencers
- ▶ Wikipedia is geen (betrouwbare) bron...
- ▶ We evalueren een bron zelf:
 - ▶ Actualiteit
 - ▶ Relevantie
 - ▶ Doel

Je eigen brein werkt tegen

21



50 COGNITIVE BIASES TO BE AWARE OF SO YOU CAN BE THE VERY BEST VERSION OF YOU

Memory

Social

Learning

Belief

Money

Politics

Fundamental Attribution Error

We judge others on their personality or fundamental character, but we judge ourselves on the situation.



Sally is late to class; she's lazy. You're late to class; it was a bad morning.

Self-Serving Bias

Our failures are situational, but our successes are our responsibility.



You won that award due to hard work rather than help or luck. Meanwhile, you failed a test because you hadn't gotten enough sleep.

In-Group Favoritism

We favor people who are in our in-group as opposed to an out-group.



Francis is in your church, so you like Francis more than Sally.

Bandwagon Effect

Ideas, fads, and beliefs grow as more people adopt them.



Sally believes fidget spinners help her children. Francis does, too.

Groupthink

Due to a desire for conformity and harmony in the group, we make irrational decisions, often to minimize conflict.



Sally wants to go get ice cream. Francis wants to shop for T-shirts. You suggest getting T-shirts with pictures of ice cream on them.

Halo Effect

If you see a person as having a positive trait, that positive impression will spill over into their other traits. (This also works for negative traits.)



"Taylor could never be mean; she's so cute!"

Moral Luck

Better moral standing happens due to a positive outcome; worse moral standing happens due to a negative outcome.



"X culture won X war because they were morally superior to the losers."

False Consensus

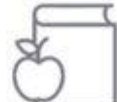
We believe more people agree with us than is actually the case.



"Everybody thinks that!"

Curse of Knowledge

Once we know something, we assume everyone else knows it, too.



Alice is a teacher and struggles to understand the perspective of her new students.

Spotlight Effect

We overestimate how much people are paying attention to our behavior and appearance.



Sally is worried everyone's going to notice how lame her ice cream T-shirt is.

Kracht van feiten neemt af

22



- ▶ Ondermijnen is makkelijker dan onderbouwen
- ▶ Je eigen waarheid kiezen

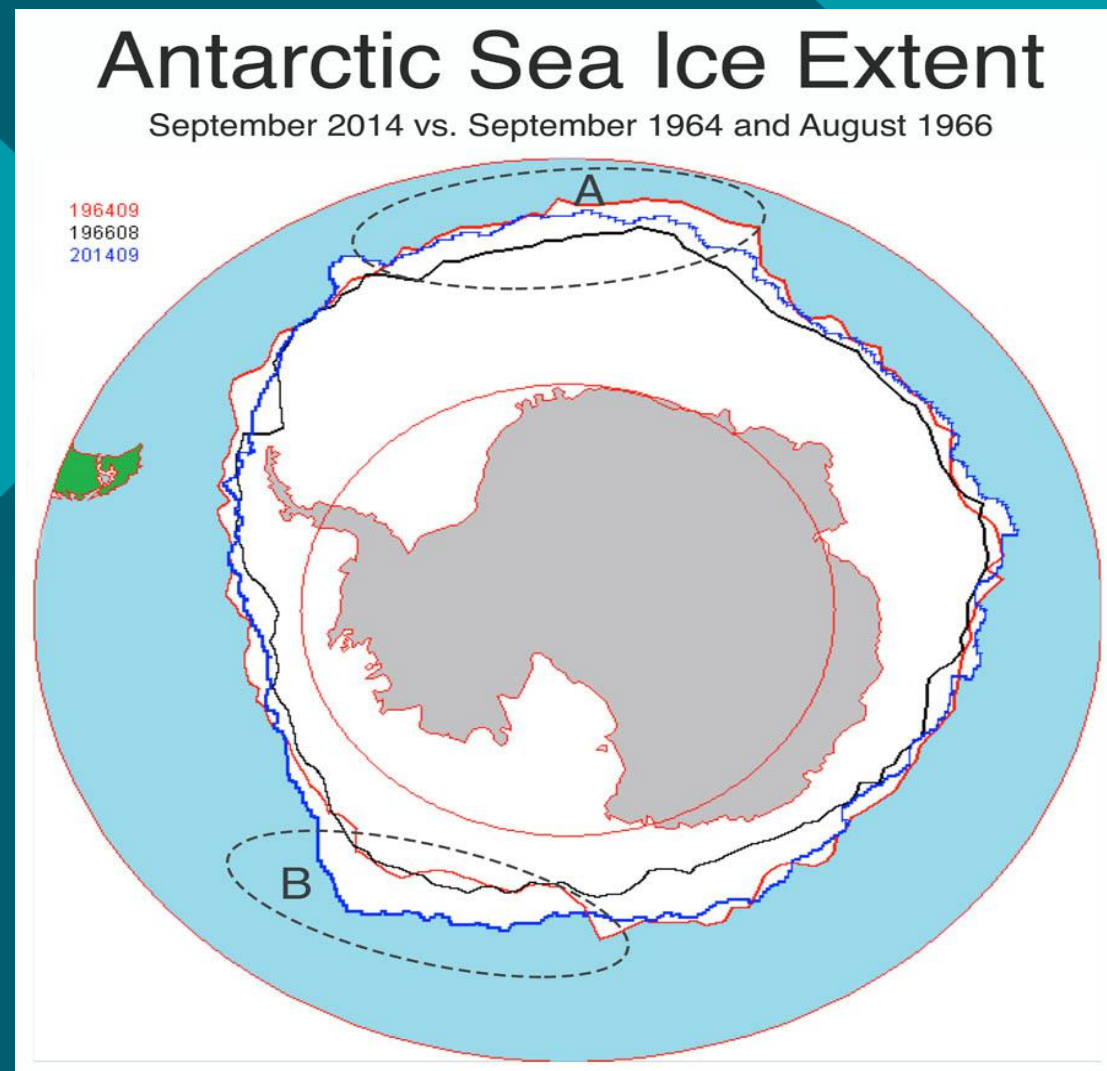
Plausibele argumentatie

23



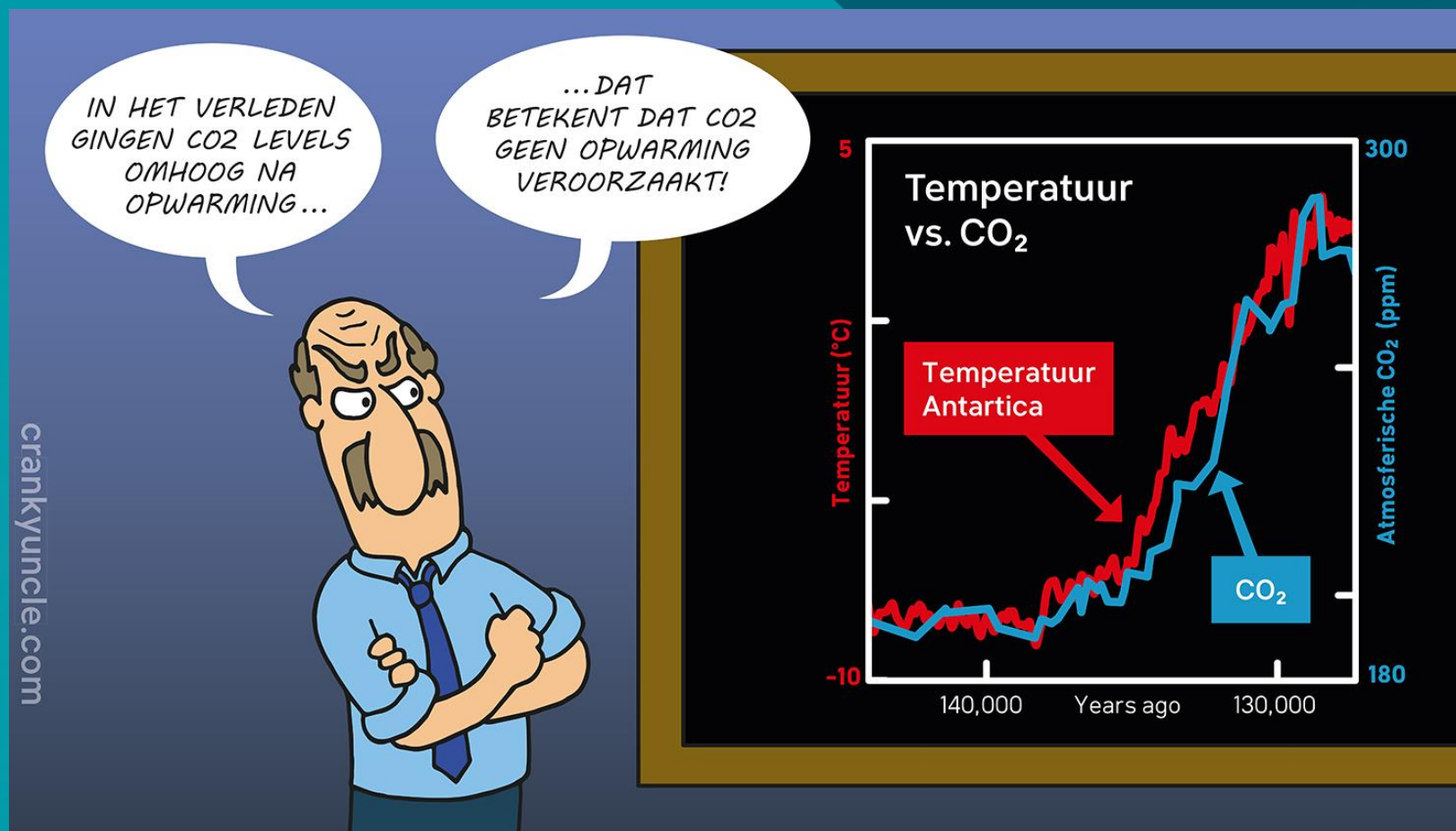
Zuidpoolijs trekt zich
helemaal niet terug!

Wat is de fout in deze
redenering?
2 Minuten met je buurmens



CO2 volgt opwarming en niet andersom..

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Waarom maskers niet helpen tegen COVID

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- ▶ Gaten in een masker zijn 3 micron doorsnede
- ▶ Het virus is 1 micron groot
- ▶ Dus het virus gaat er dwars doorheen

Iemand?



Je kunt zelf wel bepalen wat waar is.

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A screenshot of the 911Truth.Org website. The header features the logo "911Truth.Org" with the tagline "Think for Yourself. Explore the Facts." and a navigation menu with links: "Case for Complicity", "Consequences", "Precedents", "Activism", "Resources", "About Us", and "Donate". The main content area has a dark background with a city skyline and a bright light beam. Text on the page includes "What really happened on September 11", "9/11 skeptics joined with family members to seek answers to a complete picture of the events of 9/11. It took more than a year of pressure and public scrutiny before President Bush signed the bill creating the 9/11 Commission on July 27, 2002. For more than seventeen years 911Truth.Org has been asking questions that mainstream media, academics, and government officials have been reluctant to answer." A large, white, tilted rectangular box with a red border is overlaid on the right side of the page, containing the text: "• JA Qing: Just Asking Questions • De Twijfelindustrie".

911Truth.Org
Think for Yourself.
Explore the Facts.

Case for Complicity + Consequences + Precedents + Activism + Resources + About Us + Donate

What really happened on September 11

9/11 skeptics joined with family members to seek answers to a complete picture of the events of 9/11. It took more than a year of pressure and public scrutiny before President Bush signed the bill creating the 9/11 Commission on July 27, 2002. For more than seventeen years 911Truth.Org has been asking questions that mainstream media, academics, and government officials have been reluctant to answer.

• JA Qing: Just Asking Questions •
• De Twijfelindustrie

Wie vertrouwt nu een specialist?

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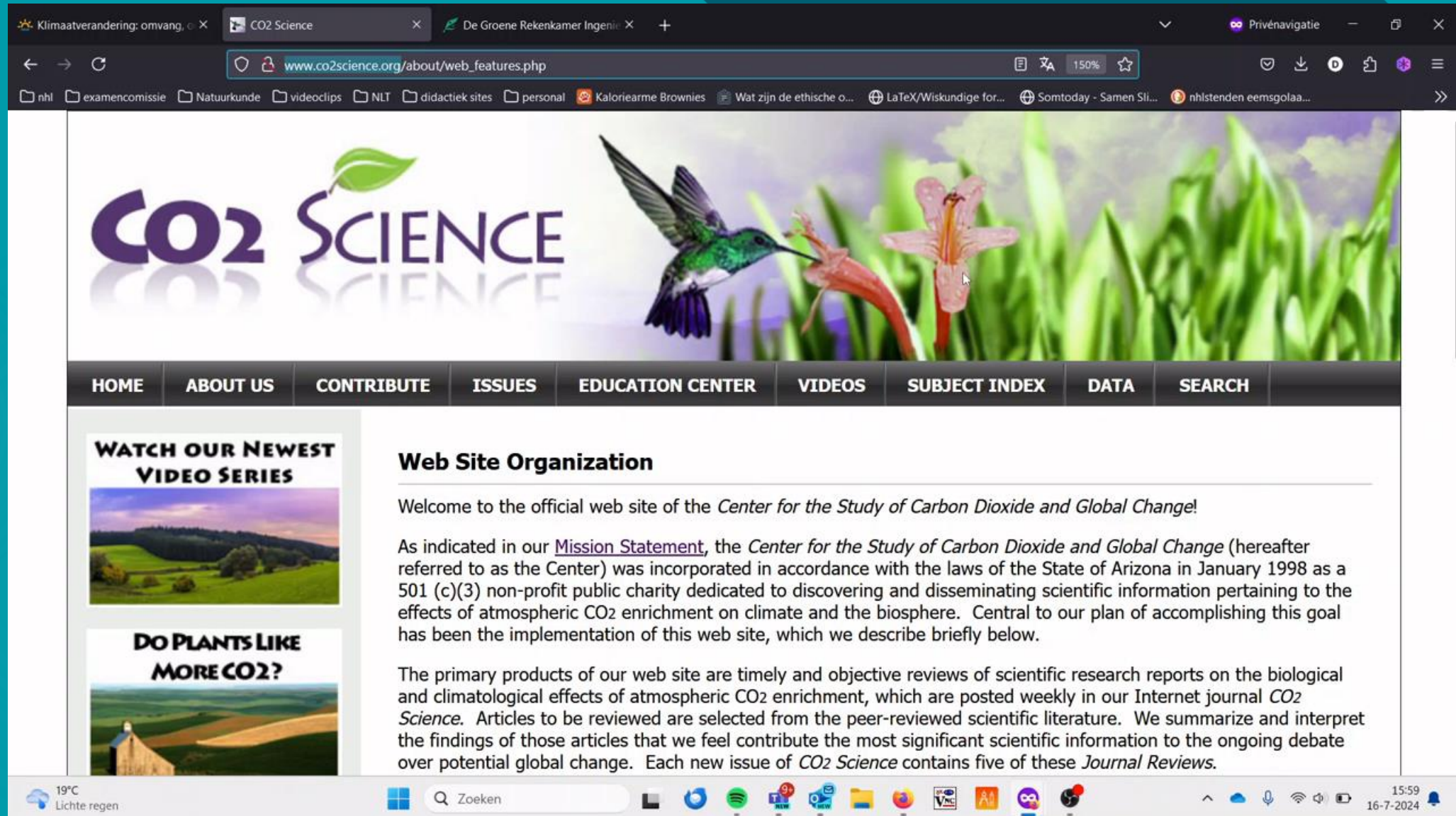
"You need a heart valve replacement."



*"These smug pilots have lost touch with regular passengers like us.
Who thinks I should fly the plane?"*

Wat doen leerlingen? 1

28



The screenshot shows a web browser window with the URL www.co2science.org/about/web_features.php. The browser's address bar and tabs are visible at the top. The website's header features the 'CO2 SCIENCE' logo on the left and a photograph of a hummingbird feeding from a pink flower on the right. Below the header is a dark navigation bar with white text links: HOME, ABOUT US, CONTRIBUTE, ISSUES, EDUCATION CENTER, VIDEOS, SUBJECT INDEX, DATA, and SEARCH. The main content area is divided into two columns. The left column contains two promotional boxes: 'WATCH OUR NEWEST VIDEO SERIES' with a landscape image, and 'DO PLANTS LIKE MORE CO2?' with an image of a person in a field. The right column is titled 'Web Site Organization' and contains a welcome message and two paragraphs of text about the Center for the Study of Carbon Dioxide and Global Change. The bottom of the browser window shows a Windows taskbar with various application icons, a search bar, and system status icons on the right.

Klimaatverandering: omvang, x CO2 Science De Groene Rekenkamer Ingenie x + Privénavigatie x

← → ↻ www.co2science.org/about/web_features.php 150% ☆

nhl examencommissie Natuurfunde videoclips NLT didactiek sites personal Kaloriearme Brownies Wat zijn de ethische o... LaTeX/Wiskundige for... Somtoday - Samen Sli... nhlistenden eemsgolaa...

CO2 SCIENCE

HOME ABOUT US CONTRIBUTE ISSUES EDUCATION CENTER VIDEOS SUBJECT INDEX DATA SEARCH

WATCH OUR NEWEST VIDEO SERIES



DO PLANTS LIKE MORE CO2?



Web Site Organization

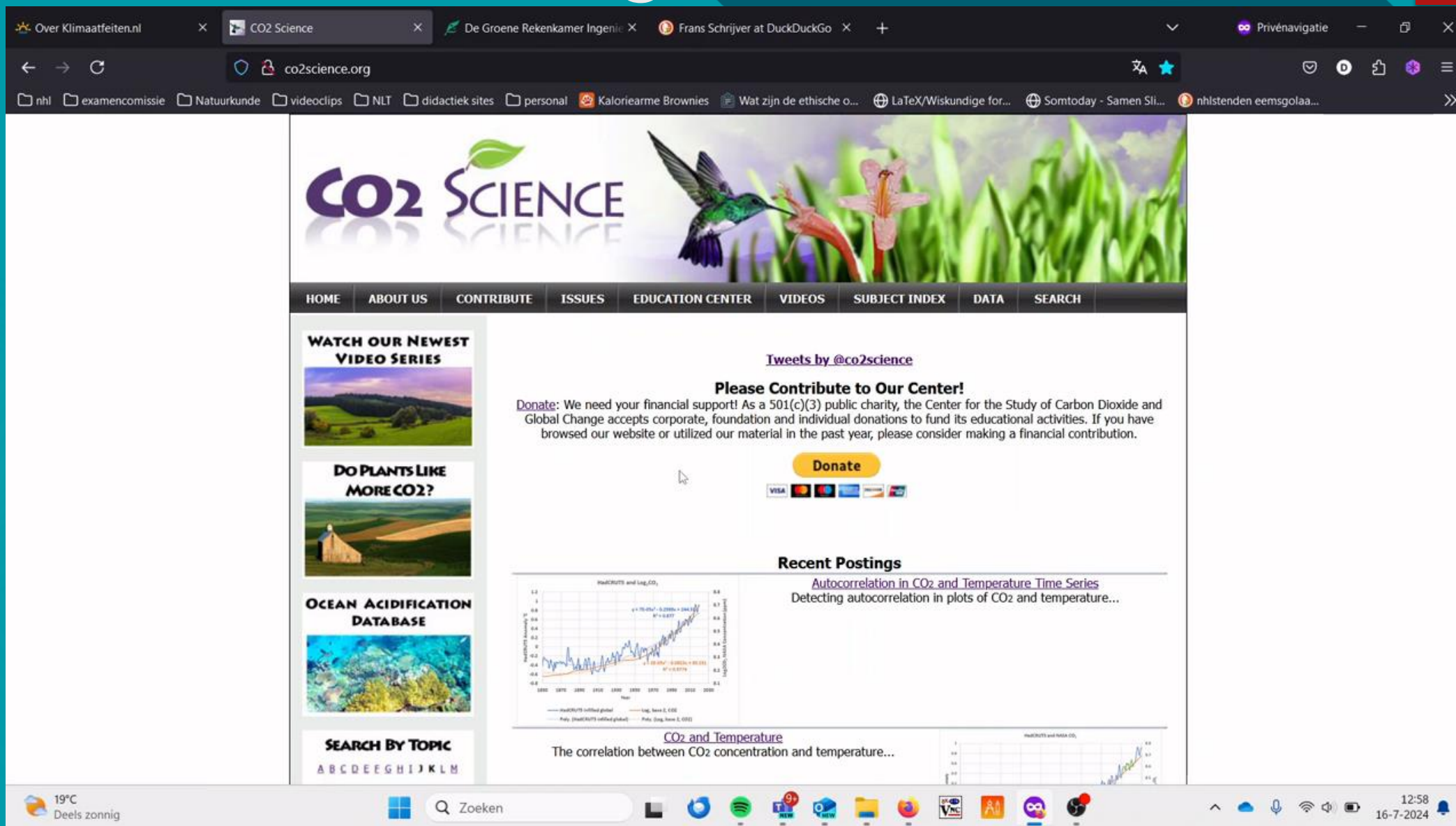
Welcome to the official web site of the *Center for the Study of Carbon Dioxide and Global Change*!

As indicated in our [Mission Statement](#), the *Center for the Study of Carbon Dioxide and Global Change* (hereafter referred to as the Center) was incorporated in accordance with the laws of the State of Arizona in January 1998 as a 501 (c)(3) non-profit public charity dedicated to discovering and disseminating scientific information pertaining to the effects of atmospheric CO₂ enrichment on climate and the biosphere. Central to our plan of accomplishing this goal has been the implementation of this web site, which we describe briefly below.

The primary products of our web site are timely and objective reviews of scientific research reports on the biological and climatological effects of atmospheric CO₂ enrichment, which are posted weekly in our Internet journal *CO₂ Science*. Articles to be reviewed are selected from the peer-reviewed scientific literature. We summarize and interpret the findings of those articles that we feel contribute the most significant scientific information to the ongoing debate over potential global change. Each new issue of *CO₂ Science* contains five of these *Journal Reviews*.

19°C Lichte regen Zoeken 15:59 16-7-2024

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Wat zien we?

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Menti.com:1175 8369



Strategien voor het evalueren en
herkennen van misinformatie



Wat zou er moeten gebeuren?

DOELEN: Leren evalueren & Vertrouwen in Wetenschap

- ▶ Mediawijsheid overbrengen
- ▶ Leren hoe wetenschap probeert tot kennis te komen
- ▶ Rol van consensus in wetenschap
- ▶ Zelfcontrole door 'De' wetenschappelijke gemeenschap

Strategiën (bewezen en getest)

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Mediawijsheid

- ▶ Parallel lezen
- ▶ Niet te snel klikken
- ▶ Wijs gebruik van wikipedia

Sociale aspecten van wetenschap

- ▶ Belangenverstrengeling
- ▶ Relevante expertise
- ▶ Consensus

Strategie 1: Parallel lezen

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- ▶ Wat zegt een ander over deze website of de auteur?
- ▶ Mooie pagina maken kan iedereen
- ▶ Iedereen kan alles beweren: “Wij van wc-eend....”



Strategie 2: Niet te snel klikken

35



- ▶ Het eerste zoekresultaat is niet altijd de beste
- ▶ Betalen om hoger in de lijst te komen
- ▶ Kijk eens bij 'de drie puntjes' o.i.d.

ECOSIA

co2science



Alle Beeld AI Chat Nieuws Video's Maps Meer Instellingen

Zoekregio: Nederland ▾ Elke tijd ▾

installatiebalie.nl · Advertentie

[Wat is koolmonoxide? - Informatie Koolmonoxide](#)

Installatiebalie is de elektrotechnische groothandel voor regionale installateurs. Maak een account aan en profiteer van leuke kortingen.

[Inloggen](#)

Alles wat je zoekt voor jouw klus.

[Locaties](#)

Ontdek onze vestigingen

Center for the Study of Carbon Dioxide and Global...

Climate change denial organization

The Center for the Study of Carbon Dioxide and Global Change is a 501(c)(3) non-profit organization based in Tempe, Arizona. It is seen

Strategie3: Wijs gebruik van wikipedia

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- ▶ Wikipedia is een 'Open' organisatie $\neq$ wild westen
- ▶ Controleerbaar
- ▶ Een goed begin voor onderzoek

Strategie 4: belangenverstrengeling

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- ▶ Follow the money
- ▶ Geldverstrekkers met grote belangen?
- ▶ Is er mogelijke belangenverstrengeling?
- ▶ Geloofwaardige wetenschappers

Strategie 5: Relevante expertise

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De auteur ..

- ▶ Is expert op het beschreven gebied?
- ▶ Werkt voor een erkende organisatie?
- ▶ Is gepubliceerd in grote wetenschappelijke tijdschriften?
- ▶ Wordt geciteerd door anderen?

Strategie 6: Consensus

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- ▶ Is er consensus in de wetenschappelijk gemeenschap?
- ▶ Hoe stellig is de bron?
- ▶ Verschillende bronnen en sites vergelijken

In het kort:

40



Can you trust this scientific claim?



Take your bearings.
Who has made this claim and why?

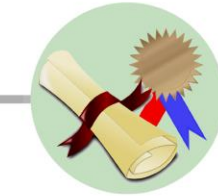


Is the source credible?

Is there a track record of honesty? Free of conflict of interest? Objective, neutral, unbiased?

TRUSTWORTHY

UNTRUSTWORTHY



Is there relevant expertise?

Does the source have credentials or experience? A history of quality work? Recognition by peers? Awards?



EXPERT

NON-EXPERT



What is the consensus?

Do the experts agree? What uncertainty remains?



NO

YES



Betrouwbaar

Is de auteur een hedendaagse deskundige?
Is de auteur te benaderen?
Is de sitebeheerder, organisatie of uitgever bekend?
Zijn er naast e-mail nog andere mogelijkheden om de makers van de site te bereiken?



Controleerbaar

Is de informatie gevonden via bibliotheken, overheden of universiteiten?
Deze instellingen stellen over het algemeen geëvalueerde informatie beschikbaar.
Is de informatie uit de bronnen voorzien van verwijzingen of literatuuropgaven?

Volledig

Is er een overzicht van gebruikte bronnen genoteerd?
Ontbreken relevante bronnen of informatie?



Actueel

Is de datum vermeld?
Is de site recent bijgewerkt?

Juist

Wat is het doel van de informatiebron (reclame, propaganda etc.)?
Bevat de bron feiten of meningen?
Worden meningen onderbouwd?
Is de bron toepasbaar?



Tip!

Uit de extensie achter de (.) kun je veel afleiden

.com = commercieel
.edu = educatief
.gov = overheid
.xs4all.nl = persoonlijk

Nu zelf: Goed doen

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- ▶ Check deze website mbv de 6 strategieën

<https://www.nvs.nl>

<https://www.climategate.nl/>

Wat kunnen we hiermee in de opleiding?

42



- ▶ Laatste 2 minuten overleggen met je buurmens

Dit waren de doelen van deze workshop

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- ▶ **Begrip** vergroten van de aard en impact van misinformatie.
- ▶ Wetenschappelijke informatie beter evalueren m.b.v. **Online denkstrategiën** en **kennis van sociale aspecten van wetenschap**
- ▶ **Hoe** integreer je wetenschappelijk redeneren in je lessen?

EINDE

Meer bronnen:

<https://sciedandmisinfo.stanford.edu/>

<http://shipseducation.net/misinfo/>

VRAGEN?

VRAGEN?

